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(54) Title: HERBICIDE MIXTURES

(57) Abstract

The efficacy of defined aryloxypicolinamide herbicides, in particular their spectrum of weed control and selectivity for the crop species, is synergistically enhanced by combination with one or more selected second herbicidal compounds.

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HERBICIDE MIXTURES

The present invention relates to an improvement in the efficacy of aryloxypicolinamide herbicides by combination with a selected second herbicidal compound.

Aryloxypicolinamides are a novel group of compounds, claimed in Applicants' European Patent No. 447004, which show excellent herbicidal activity, in particular against broad leaf weeds in cereal crops. However, the aryloxypicolinamides when used as the sole active ingredient do not always achieve effective control of the full spectrum of weed species encountered in commercial agronomic practice, in conjunction with reliable selectivity for the crop species. Such gaps in the spectrum of control can often be remedied by co-treatment with another herbicide known to be effective against the relevant weed species. In the course of their investigations into the efficacy of various partners for aryloxypicolinamides, Applicants have found that selected combinations produce not merely the expected, additive effect, but exhibit a significant synergistic effect (i.e. these combinations show a much higher level of activity than predicted from that of the individual compounds) which enables a greater selectivity for the crop species.

A mixture of herbicides shows a synergistic effect if the herbicidal activity of the mixture is larger than sum of activities of the separately applied compounds. The expected herbicidal activity for a given mixture of two herbicides can be calculated as follows: (comp. Colby, S.R., "Calculating synergistic and antagonistic response of herbicide combinations", Weeds 15, pp 20-22 (1967)):

$$WE.=X+\frac{Yx(100-X)}{100}$$

Wherein

X is the percentage of growth inhibition upon treatment with a herbicide 1 at a dosage of p kg/ha compared with an untreated control (X=0%)

Y is the percentage of growth inhibition upon treatment with a herbicide 2 at a dosage of q kg/ha compared with an untreated control

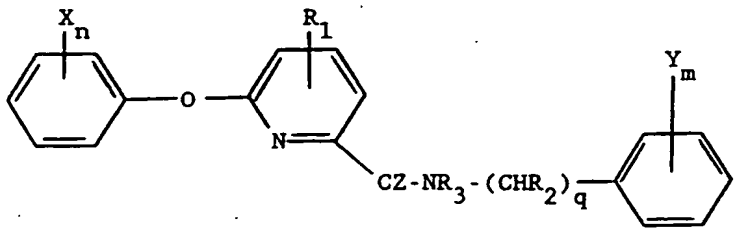
WE. is the herbicidal effect to be expected upon treatment (% of growth inhibition compared with untreated control) with a combination of herbicide 1 and 2 at a dosage of p + q g/ha

If the actual weed control (W) exceeds the expected (calculated) weed control (WE), the mixture shows a synergistic effect.

Thus, the combinations of the present invention not only achieve control of certain weed species which are difficult to combat effectively with aryloxypicolinamides alone, in particular grass weeds such as Alopecurus myosuroides; Apera spica-venti; and Echinocloa crus-galli, but also show significant synergistic increase in the level of activity against those weeds and also many broad-leaved weeds. This combination of advantages yields important benefits in practical agronomic applications. Firstly, it provides treatment for cereal crops which will control the majority of the significant weed species; secondly it enables that effective control to be attained with lower application rates of active material - with consequential environmental benefits and also greater selectivity of action in favour of the crop species.

Accordingly, the present invention provides a herbicidal composition comprising a herbicidally acceptable carrier and/or surface active agent together with, as active ingredient, a mixture of:-

at least one aryloxypicolinamide of the general formula I



(I)

in which

Z represents an oxygen or sulphur atom;

R_1 represents a hydrogen or halogen atom or an alkyl or haloalkyl group;

R_2 represents a hydrogen atom or an alkyl group;

q is 0 or 1;

R_3 represents a hydrogen atom or an alkyl or alkenyl group;

the or each group X independently represents a halogen atom or an optionally substituted alkyl or alkoxy group, preferably a haloalkyl group, or an alkenyloxy, cyano, carboxy, alkoxycarbonyl, (alkylthio)carbonyl, alkylcarbonyl, amido, alkylamido, nitro, alkylthio, haloalkylthio, alkenylthio, alkynylthio, alkylsulphinyl, alkylsulphonyl, alkyloximinoalkyl or alkenyloximinoalkyl group;

n is 0 or an integer from 1 to 5;

the or each group Y independently represents a halogen atom or an alkyl, nitro, cyano, haloalkyl, alkoxy or haloalkoxy group;

and m is 0 or an integer from 1 to 5;

together with a second herbicidal component selected from:-

a) a urea-type herbicide, in particular chlortoluron, isoproturon, linuron or neburon;

b) a triazine-type herbicide in particular atrazine, cyanazine or simazine;

c) a hydroxybenzonitrile herbicide in particular bromoxynil or ioxynil; and

d) an aryloxyalkanoic acid herbicide in particular dichlorprop, diclofop, MCPA or mecoprop (CMPP).

e) a dinitroaniline herbicide, such as pendimethalin;

f) a thiocarbamate herbicide, such as prosulfocarb;

g) amidosulfuron;

h) a diphenyl ether herbicide, such as aclonifen;

i) a pyridazine herbicide, such as pyridate;

j) a fluorene carboxylic acid herbicide, such as flurenol;

k) a pyridyloxyacetic acid herbicide, such as fluroxypyr;

l) an arylalanine herbicide, such as flamprop-isopropyl.

The pattern of persistence of the aryloxypicolinamide (abbreviated herein as "AOP") is such that the combined treatment of the present invention can be attained either by the application of a prepared mixture as defined above, or by time separated application of separate formulations. Hence, in another embodiment, the present invention provides a method for controlling the growth of weeds at a cereal crop locus which comprises applying to the locus an AOP as defined in above, and a second component which is selected from those listed above.

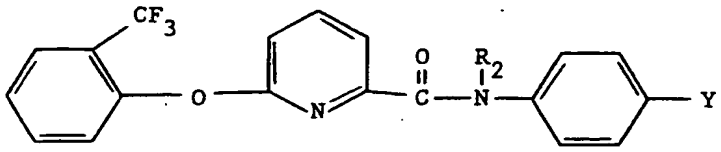
The treatment according to the invention may be used to control a broad spectrum of weed species in cereal crops, e.g. wheat, barley, rice and maize by pre- or postemergence treatment, especially early and late post-emergence, without significant damage to the crop.

The term "pre-emergence application" means application to a soil in which seeds or seedlings are present before the emergence of the weeds above the surface of the soil. "Post-emergence application" means application to the aerial or exposed portions of the weeds which have emerged above the surface of the soil.

Weeds that may be controlled by the combinations include:

Veronica persica	Veronica hedearaefolia	Stellaria media
Lamium purpureum	Lamium amplexicaule	Aphanes arvensis
Galium aparine	Alopecurus myosuroides	Matricaria inodora
Matricarria matricoides	Anthemis arvensis	Papaver rhoeas
Poa annua	Apera spica-venti	Phalaris paradoxa
Phalaris minor	Avena fatua	Lolium perenne
Bromus sterilis	Poa trivialis	Spergula arvensis
Cerastes holosteoides	Arenaria seryllifolia	Silene vulgaris
Legousia hybrida	Geranium dissectum	Montia perfoliata
Myosotis arvensis	Chenopodium arvensis	Polygonum aviculare
Polygonum lapathifolium	Polygonum convolvulus	Galeopsis tetrahit
Chrysantemum segetum	Centaurea cyanus	Viola arvensis
Senecio vulgaris	Cirsium arvense	

The preferred compound for use as the aryloxypicolinamide component is of the general formula:-



(II)

wherein R_2 is a hydrogen atom or an ethyl group, and Y is a hydrogen or fluorine atom.

The application rate of the AOP component is normally in the range of 25 to 250 grams of active ingredient (gai) per hectare, with rates between 30-100 gai/ha often achieving satisfactory control and selectivity. The optimal rate for a specific application will depend on the crop(s) under cultivation and the predominant species of infesting weed and can readily be determined by established biological tests.

The selection of the second component will likewise be dependent on the crop/weed situation to be treated, and will be readily identifiable by those skilled in this area. The application rate of the second component is determined primarily by the chemical type of that component, since the intrinsic activity of different types of herbicide varies widely. For example, the activity of a triazine herbicide, such as cyanazine or simazine, can be almost tenfold greater than that of a urea herbicide such as chlortoluron or isoproturon. In general, the application rate of the second component is in the range of 500 to 5000 gai/ha, preferably 1000-2500 gai/ha, when the second component is a urea or thiocarbamate herbicide; in the range 25 to 100 gai/ha when the second component is amidosulfuron or a pyridyloxyacetic acid herbicide; and in the range 100 to 750 gai/ha when the second component is one of the other herbicide groups listed above. Again, the optimal rate for the chosen second component will depend on the crop(s) under cultivation and the level of weed infestation, and can readily be determined by established biological tests. Naturally, with such a wide variation in application rate for the

second component, the ratio of AOP to that second component will be determined predominantly by the choice of second component. Thus, the ratio AOP: Second Component may vary from 2:1 (second component = amidosulfuron) to 1:60 (second component = prosulfocarb).

EXAMPLES:

General Method:

The trials were carried out under glasshouse conditions as pre- and post-emergence applications. The plant seeds were sown in pots containing a loamy sand soil (0.5 l). The herbicides were applied as single treatments, or in a combination comprising an AOP compound of formula I and a second compound as designated, before or after emergence of weeds and crop. The herbicidal performance was assessed as percent damage in comparison to the untreated control plants. The assessment was done 21 days after the treatment. Wheat and barley were treated at the 3-4 leaf stage, the broad-leaved weeds at the 2-4 leaf stage.

The AOP component employed for most of the evaluation was the compound of formula II above wherein Y is a fluorine atom and R_2 is a hydrogen atom, and in the results listed hereafter is designated WL 161616. Two other AOP compound of formula II above were also evaluated, namely:- i) the compound wherein Y is a hydrogen atom and R_2 is an ethyl group (designated WL 165181), and ii) the compound wherein Y and R_2 both represent a hydrogen atom (designated WL 163193).

The second component was selected from those listed above, with application rates (and hence component ratios) chosen to be appropriate to the established activity level of that second component.

The results of these experiments are tabulated as Examples 1 to 17, wherein all the results from a chosen "second component" are collected under the same Example number, different dosage rates/test species being recorded as "1A", "1B" etc. From these results it is clear that all experiments demonstrated the synergism between the AOPs and the designated second compound. Crop tolerance (wheat and barley) was excellent in all treatments.

Example 1A: Herbicidal performance of the mixture WL 161616 + Isoproturon (30 g a.i./ha + 1000 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Isoproturon 1000 g a.i./ha	WL 161616 + Isoproturon 30 g a.i./ha + 1000 g a.i./ha	
	% control		WE	W
Polygonum convolvulus	77	70	93	100
Thlaspi arvense	70	70	91	98
Capsella bursa-pastoris	85	25	89	99
Sinapis arvense	63	57	84	91
Lamium purpureum	25	40	55	92
Matricaria inodora	25	75	81	100
Galium aparine	90	0	90	98

WE = expected response by means of the Colby formula
W = observed response

Expected control of Polygonum convolvulus, Thlaspi arvense, Capsella bursa-pastoris, Sinapis arvense, Lamium purpureum, Matricaria inodora and Galium aparine was 93, 91, 89, 84, 55, 81 and 90 resp., clearly demonstrating that the combination was synergistic.

Example 1B: Herbicidal performance of the mixture WL 161616 + Isoproturon (30 g a.i./ha + 1000 g a.i./ha) against grass weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Isoproturon 1000 g a.i./ha	WL 161616 + Isoproturon 30 g a.i./ha + 1000 g a.i./ha	
	% control		WE	W
Alopecurus myosuorides	3	45	47	65
Apera spica-venti	3	73	74	89

WE = expected response by means of the Colby formula
W = observed response

Expected control of Alopecurus myosuorides and Apera spica-venti was 47 and 74 resp., clearly demonstrating that the combination was synergistic.

Example 10: Herbicidal performance of the mixture WL 161616 + Isoproturon (60 g a.i./ha + 1000 g a.i./ha) against Apera spica-venti in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Isoproturon 1000 g a.i./ha	WL 161616 + Isoproturon 60 g a.i./ha + 1000 g a.i./ha	
	% control		WE	W
Apera spica-venti	20	73	79	92

WE = expected response by means of the Colby formula
W = observed response

Expected control of Apera spica-venti was 79, clearly demonstrating that the combination was synergistic.

Example 1D: Herbicidal performance of the mixture WL 161616 + Isoproturon (60 g a.i./ha + 960 g a.i./ha) against broad-leaved and grass weeds in pre-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Isoproturon 960 g a.i./ha	WL 161616 + Isoproturon 60 g a.i./ha + 960 g a.i./ha	
	% control		WE	W
Stellaria media	0	57	57	75
Viola arvensis	82	2	82	96
Veronica persica	15	2	17	55
Alopecurus myosuroides	2	22	24	68

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Viola arvensis, Veronica persica and Alopecurus myosuroides was 57, 82, 17, and 24 resp., clearly demonstrating that the combination was synergistic.

Example 1E: Herbicidal performance of the mixture WL 161616 + Isoproturon (120 g a.i./ha + 960 g a.i./ha) against broad-leaved and grass weeds

broad-leaved weeds	WL 161616 120 g a.i./ha	Isoproturon 960 g a.i./ha	WL 161616 + Isoproturon 120 g a.i./ha + 960 g a.i./ha	
	% control		WE	W
Stellaria media	0	57	57	85
Veronica persica	70	2	71	80
Alopecurus myosuroides	13	22	32	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Veronica persica and Alopecurus myosuroides was 57, 71 and 32 resp., clearly demonstrating that the combination was synergistic.

Example 1F: Herbicidal performance of the mixture WL 161616 + Isoproturon (60 g a.i./ha + 1440 g a.i./ha) against broad-leaved and grass weeds in pre-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Isoproturon 1440 g a.i./ha	WL 161616 + Isoproturon 60 g a.i./ha + 1440 g a.i./ha	
	% control		WE	W
Stellaria media	0	67	67	99
Viola arvensis	82	20	86	94
Veronica persica	15	60	66	85
Alopecurus myosuroides	70	25	78	88

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Viola arvensis, Veronica persica and Alopecurus myosuroides was 67, 86, 66 and 78 resp., clearly demonstrating that the combination was synergistic.

Example 1G: Herbicidal performance of the mixture WL 161616 + Isoproturon (120 g a.i./ha + 1440 g a.i./ha) against Alopecurus myosuroides

broad-leaved weeds	WL 161616 120 g a.i./ha	Isoproturon 1440 g a.i./ha	WL 161616 + Isoproturon 120 g a.i./ha + 1440 g a.i./ha	
	% control		WE	W
Alopecurus myosuroides	12	25	34	87

WE = expected response by means of the Colby formula
W = observed response

Expected control of Alopecurus myosuroides was 34, clearly demonstrating that the combination was synergistic.

Example 1H: Herbicidal performance of the mixture IPU/Flurenol (1000 g a.i./ha + 180 g a.i./ha) + WL 161616 (30 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	IPU+Flurenol 1000+180 g a.i./ha	WL 161616 30 g a.i./ha	IPU+Flurenol + WL 161616 1000+180 g a.i./ha + 30 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	68	45	82	96
Lamium purpureum	48	25	61	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl) and Lamium purpureum was 82 and 61 resp., clearly demonstrating that the combination was synergistic.

Example 1J: Herbicidal performance of the mixture IPU/Flurenol (1000 g a.i./ha + 180 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds and grasses in post-emergence application

broad-leaved weeds and grasses	IPU+Flurenol 1000+180 g a.i./ha	WL 161616 60 g a.i./ha	IPU+Flurenol + WL 161616 1000+180 g a.i./ha + 60 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	68	45	82	96
Lamium purpureum	48	38	68	99
Alopecurus myosuroides	33	5	36	75

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Lamium purpureum and Alopecurus myosuroides was 82, 68 and 36 resp., clearly demonstrating that the combination was synergistic.

Example 1K: Herbicidal performance of the mixture IPU/Flurenol (2000 g a.i./ha + 180 g a.i./ha) + WL 161616 (30 g a.i./ha) against broad-leaved weeds and grasses in post-emergence application

broad-leaved weeds and grasses	IPU+Flurenol 2000+180 g a.i./ha	WL 161616 30 g a.i./ha	IPU+Flurenol + WL 161616 2000+180 g a.i./ha + 30 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	73	45	85	96
Alopecurus myosuroides *	53	4	55	83

* initial efficacy 20 days after treatment

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl) and Alopecurus myosuroides was 85 and 55 resp., clearly demonstrating that the combination was synergistic.

Example 1L: Herbicidal performance of the mixture IPU/Flurenol (2000 g a.i./ha + 180 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds and grasses in post-emergence application

broad-leaved weeds and grasses	IPU+Flurenol 2000+180 g a.i./ha	WL 161616 60 g a.i./ha	IPU+Flurenol + WL 161616 2000+180 g a.i./ha + 60 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	73	45	85	96
Galium aparine (3. whorl)	68	60	87	96
Alopecurus myosuroides *	53	5	55	92

* initial efficacy 20 days after treatment

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl) and Alopecurus myosuroides was 85, 87 and 55 resp., clearly demonstrating that the combination was synergistic.

Example 2A: Herbicidal performance of the mixture WL 161616 + Chlortoluron (120 g a.i./ha + 1920 g a.i./ha = mixture 1:16) against broad-leaved and grass weeds in post-emergence application

weeds	WL 161616 120 g a.i./ha	Chlortoluron 1920 g a.i./ha	WL 161616 + Chlortoluron 120 g a.i./ha + 1920 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	53	73	87	100
Matricaria inodora	18	75	80	100
Cirsium arvense	50	83	92	100
Senecio vulgaris	55	43	74	98
Lamium purpureum	8	58	61	81
Alopecurus * myosuroides	35	15	45	88

* initial efficacy

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Matricaria inodora, Cirsium arvense, Senecio vulgaris, Lamium pupureum and Alopecurus myosuroides was 87, 80, 92, 74, 61 and 45 resp., clearly demonstrating that the combination was synergistic.

Example 2B: Herbicidal performance of the mixture WL 161616 + Chlortoluron (120 g a.i./ha + 960 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

weeds	WL 161616 120 g a.i./ha	Chlortoluron 960 g a.i./ha	WL 161616 + Chlortoluron 120 g a.i./ha + 960 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	73	38	83	100
Galium aparine (2. whorl)	53	25	65	100
Stellaria media	15	68	73	100
Veronica hederaefolia	89	0	89	96
Matricaria inodora	18	28	41	93
Chenopodium album	38	33	58	100
Cirsium arvense	50	48	74	100
Senecio vulgaris	55	23	65	83

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Chenopodium album, Cirsium arvense and Senecio vulgaris was 83, 65, 73, 89, 41, 58, 74 and 65 resp., clearly demonstrating that the combination was synergistic.

Example 2C: Herbicidal performance of the mixture WL 161616 + Chlortoluron (120 g a.i./ha + 480 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Chlortoluron 480 g a.i./ha	WL 161616 + Chlortoluron 120 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	73	10	76	100
Galium aparine (2. whorl)	53	3	54	93
Stellaria media	15	15	28	100
Veronica hederaefolia	89	0	89	97
Matricaria inodora	18	10	26	90
Polygonum convolvulus	30	48	65	100
Chenopodium album	38	8	43	85
Cirsium arvense	50	23	62	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Polygonum convolvulus, Chenopodium album and Cirsium arvense was 76, 54, 28, 89, 26, 65, 43 and 62 resp., clearly demonstrating that the combination was synergistic.

Example 2D: Herbicidal performance of the mixture WL 161616 + Chlortoluron (120 g a.i./ha + 240 g a.i./ha = mixture 1:2) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Chlortoluron 240 g a.i./ha	WL 161616 + Chlortoluron 120 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	73	3	74	100
Galium aparine (2. whorl)	53	0	53	93
Stellaria media	15	3	18	100
Galeopsis tetrahit	58	65	85	100
Veronica hederaefolia	89	0	89	97
Matricaria inodora	18	8	25	90
Polygonum convolvulus	30	38	57	100
Cirsium arvense	50	13	57	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Galeopsis tetrahit, Veronica hederaefolia, Matricaria inodora, Polygonum convolvulus and Cirsium arvense was 74, 53, 18, 85, 89, 25, 57 and 57 resp., clearly demonstrating that the combination was synergistic.

Example 2E: Herbicidal performance of the mixture WL 161616 + Chlortoluron (60 g a.i./ha + 1920 g a.i./ha = mixture 1:32) against broad-leaved and grass weeds in post-emergence application

weeds	WL 161616 60 g a.i./ha	Chlortoluron 1920 g a.i./ha	WL 161616 + Chlortoluron 60 g a.i./ha + 1920 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	60	75	90	100
Galium aparine	50	73	87	100
Matricaria inodora	10	75	78	100
Cirsium arvense	33	83	89	100
Senecio vulgaris	33	43	62	83
Lamium purpureum	8	58	61	79
Alopecurus * myosuroides	18	15	30	80

* initial efficacy

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Matricaria inodora, Cirsium arvense, Senecio vulgaris, Lamium pupureum and Alopecurus myosuroides was 90, 87, 78, 89, 62, 61 and 30 resp., clearly demonstrating that the combination was synergistic.

Example2F: Herbicidal performance of the mixture WL 161616 + Chlortoluron (60 g a.i./ha + 960 g a.i./ha = mixture 1:16) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Chlortoluron 960 g a.i./ha	WL 161616 + Chlortoluron 60 g a.i./ha + 960 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	60	38	75	100
Galium aparine (2. whorl)	50	25	63	100
Stellaria media	10	68	71	100
Veronica hederaefolia	83	0	83	92
Matricaria inodora	10	28	35	96
Chenopodium album	28	33	55	100
Cirsium arvense	33	48	65	100
Senecio vulgaris	33	23	48	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Chenopodium album, Cirsium arvense and Senecio vulgaris was 75, 63, 71, 83, 35, 55, 65 and 48 resp., clearly demonstrating that the combination was synergistic.

Example 2G: Herbicidal performance of the mixture WL 161616 + Chlortoluron (60 g a.i./ha + 480 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Chlortoluron 480 g a.i./ha	WL 161616 + Chlortoluron 60 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	60	10	64	100
Galium aparine (2. whorl)	50	3	52	80
Stellaria media	10	15	24	100
Veronica hederaefolia	83	0	83	90
Matricaria inodora	10	10	19	85
Polygonum convolvulus	18	48	58	100
Chenopodium album	28	8	34	85
Cirsium arvense	33	23	48	100
Senecio vulgaris	33	13	42	75

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Polygonum convolvulus, Chenopodium album, Cirsium arvense and Senecio vulgaris was 64, 52, 24, 83, 19, 58, 34, 48 and 42 resp., clearly demonstrating that the combination was synergistic.

Example 2H: Herbicidal performance of the mixture WL 161616 + Chlortoluron (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Chlortoluron 240 g a.i./ha	WL 161616 60 g a.i./ha + Chlortoluron 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	60	3	61	100
Galium aparine (2. whorl)	50	0	50	80
Stellaria media	10	3	12	93
Galeopsis tetrahit	55	65	84	100
Sinapis arvensis	80	32	86	100
Veronica hederaefolia	83	0	83	95
Polygonum convolvulus	18	38	49	90
Cirsium arvense	33	13	42	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Galeopsis tetrahit, Sinapis arvensis, Veronica hederaefolia, Polygonum convolvulus and Cirsium arvense was 61, 50, 12, 84, 86, 83, 49 and 42 resp., clearly demonstrating that the combination was synergistic.

Example 2J: Herbicidal performance of the mixture WL 161616 + Chlortoluron (30 g a.i./ha + 960 g a.i./ha = mixture 1:32) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Chlortoluron 960 g a.i./ha	WL 161616 + Chlortoluron 30 g a.i./ha + 960 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	43	38	64	100
Galium aparine (2. whorl)	35	25	51	95
Stellaria media	10	68	71	95
Veronica hederaefolia	73	0	73	93
Matricaria inodora	5	28	32	90
Chenopodium album	18	33	45	90
Cirsium arvense	23	48	60	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Chenopodium album and Cirsium arvense was 64, 51, 71, 73, 32, 45 and 60 resp., clearly demonstrating that the combination was synergistic.

Example 2K : Herbicidal performance of the mixture WL 161616 + Chlortoluron (30 g a.i./ha + 480 g a.i./ha = mixture 1:16) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Chlortoluron 480 g a.i./ha	WL 161616 + Chlortoluron 30 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	43	10	49	92
Galium aparine (2. whorl)	35	3	37	86
Stellaria media	10	15	24	92
Veronica hederaefolia	73	0	73	89
Matricaria inodora	5	10	15	75
Polygonum convolvulus	15	48	56	78
Cirsium arvense	23	23	41	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Veronica hederaefolia, Matricaria inodora, Polygonum convolvulus and Cirsium arvense was 49, 37, 24, 73, 15, 56 and 41 resp., clearly demonstrating that the combination was synergistic.

Example 3A: Herbicidal performance of the mixture WL 161616 + Cyanazine (60 g a.i./ha + 300 g a.i./ha = mixture 1:5) against broad-leaved and grass weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Cyanazine 300 g a.i./ha	WL 161616 + Cyanazine 60 g a.i./ha + 300 g a.i./ha	
	% control		WE	W
Galium aparine	55	3	57	100
Matricaria inodora	80	70	94	100
Polygonum convolvulus	88	83	97	100
Stellaria media	58	71	88	100
Alopecurus myosuroides	18	28	41	70

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine, Matricaria inodora, Polygonum convolvulus, Stellaria media and Alopecurus myosuroides was 57, 94, 97, 88, and 41 resp., clearly demonstrating that the combination was synergistic.

Example 3B: Herbicidal performance of the mixture WL 161616 + Cyanazine (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Cyanazine 240 g a.i./ha	WL 161616 + Cyanazine 60 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Matricaria inodora	67	82	93	100
Galium aparine 1. whorl	70	0	70	80
Galium aparine 3. whorl	60	0	60	75
Veronica persica	65	55	84	100
Stellaria media	60	67	87	100
Lamium amplexicaule	25	1	25	70
Polygonum convolvulus	45	47	71	88

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl and 3. whorl), Veronica persica, Stellaria media, Lamium amplexicaule and Polygonum convolvulus was 70, 60, 84, 87, 25 and 71 resp., clearly demonstrating that the combination was synergistic.

Example 3C: Herbicidal performance of the mixture WL 161616 + Cyanazine (30 g a.i./ha + 300 g a.i./ha = mixture 1:10) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Cyanazine 300 g a.i./ha	WL 161616 + Cyanazine 30 g a.i./ha + 300 g a.i./ha	
	% control		WE	W
Galium aparine 1. whorl	55	0	55	68
Veronica persica	47	62	80	100
Stellaria media	35	85	90	98
Lamium amplexicaule	8	1	8	84
Polygonum convolvulus	30	47	63	96
Matricaria inodora	63	70	89	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Veronica persica, Stellaria media, Lamium amplexicaule, Polygonum convolvulus, and Matricaria inodora was 55, 80, 90, 8, 63 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 3D: Herbicidal performance of the mixture WL 161616 + Cyanazine (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Cyanazine 240 g a.i./ha	WL 161616 + Cyanazine 30 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine 1. whorl	55	0	55	70
Veronica persica	47	62	79	98
Lamium amplexicaule	7	2	9	84
Polygonum convolvulus	30	47	63	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Veronica persica, Lamium amplexicaule and Polygonum convolvulus was 55, 79, 9, and 63 resp., clearly demonstrating that the combination was synergistic.

Example 3E: Herbicidal performance of the mixture WL 161616 + Cyanazine (30 g a.i./ha + 150 g a.i./ha = mixture 1:5) against broad-leaved and weeds

broad-leaved weeds	WL 161616 30 g a.i./ha	Cyanazine 150 g a.i./ha	WL 161616 + Cyanazine 30 g a.i./ha + 150 g a.i./ha	
	% control		WE	W
Galium aparine	15	7	21	55
Matricaria inodora	63	48	81	88
Polygonum convolvulus	78	48	89	98
Stellaria media	48	50	74	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine, Matricaria inodora, Polygonum convolvulus and Stellaria media was 21, 81, 89, and 74 resp., clearly demonstrating that the combination was synergistic.

Example 3F: Herbicidal performance of the mixture WL 163193 + Cyanazine (60 g a.i./ha + 300 g a.i./ha = mixture 1:5) against broad-leaved and grass weeds in post-emergence application

broad-leaved weeds	WL 163193 60 g a.i./ha	Cyanazine 300 g a.i./ha	WL 163193 + Cyanazine 60 g a.i./ha + 300 g a.i./ha	
	% control		WE	W
Galium aparine	70	3	72	75
Matricaria inodora	57	70	87	100
Stellaria media	30	71	80	100
Alopecurus myosuroides	25	28	46	63

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine, Matricaria inodora, Stellaria media and Alopecurus myosuroides was 72, 87, 80, and 46 resp., clearly demonstrating that the combination was synergistic.

Example 3G: Herbicidal performance of the mixture WL 165181 + Cyanazine (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 165181 60 g a.i./ha	Cyanazine 240 g a.i./ha	WL 165181 + Cyanazine 60 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Matricaria inodora	20	82	86	97
Galium aparine 1. whorl	80	0	80	96
Stellaria media	80	67	93	100
Lamium amplexicaule	23	2	24	99
Polygonum convolvulus	32	47	64	99

WE = expected response by means of the Colby formula
W = observed response

Expected control of Matricaria inodora, Galium aparine (1. whorl), Stellaria media, Lamium amplexicaule and Polygonum convolvulus was 86, 80, 93, 24, and 64 resp., clearly demonstrating that the combination was synergistic.

Example 3H: Herbicidal performance of the mixture WL 165181 + Cyanazine (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 165181 30 g a.i./ha	Cyanazine 240 g a.i./ha	WL 165181 + Cyanazine 30 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine 1. whorl	60	0	60	85
Veronica persica	67	55	85	100
Lamium amplexicaule	10	2	12	87
Polygonum convolvulus	5	47	50	100
Stellaria media	67	67	89	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Veronica persica, Lamium amplexicaule, Polygonum convolvulus and Stellaria media was 60, 85, 12, 50 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 4A: Herbicidal performance of the mixture WL 161616 + Bromoxynil Octanoate (120 g a.i./ha + 120 g a.e./ha = mixture 1:1) against broad-leaved weeds

broad-leaved weeds	WL 161616 + Bromoxynil Octanoate		WL 161616 + Bromoxynil Octanoate	
	120 g a.i./ha	120 g a.e./ha	120 g a.i./ha + 120 g a.e./ha	
	% control		WE	W
Stellaria media	70	50	85	100
Galeopsis tetrahit	57	50	79	93
Papaver rhoeas	30	17	42	70
Chrysanthemum segetum	40	0	40	45
Galium aparine 1. whorl	80	77	95	100
Galium aparine 2. whorl	27	40	56	82
Galium aparine 3. whorl	35	70	81	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Papaver rhoeas, Chrysanthemum segetum, Galium aparine (1st, 2nd and 3rd whorl) using the Colby formula was 85, 79, 42, 40, 95, 56 and 81 resp., clearly demonstrating that the combination was synergistic.

Example 4B: Herbicidal performance of the mixture WL 161616 + Bromoxynil Octanoate (60 g a.i./ha + 240 g a.e./ha = mixture 1:4) against broad-leaved weeds

broad-leaved weeds	WL 161616 60 g a.i./ha	Bromoxynil Octanoate 240 g a.e./ha	WL 161616 + Bromoxynil Octanoate 60 g a.i./ha + 240 g a.e./ha	
	% control		WE	W
Galium aparine 2. whorl	22	57	66	88
Galium aparine 3. whorl	20	87	90	99
Stellaria media	55	57	81	96
Papaver rhoeas	7	87	88	99
Chrysanthemum segetum	5	65	67	92

WE = expected response by means of the Colby formula

W = observed response

Expected control of Galium aparine (2nd and 3rd whorl), Stellaria media, Papaver rhoeas and Chrysanthemum using the Colby formula was 66, 90, 81, 88 and 67 resp., clearly demonstrating that the combination was synergistic.

Example 4C: Herbicidal performance of the mixture WL 161616 + Bromoxynil Octanoate (60 g a.i./ha + 120 g a.e./ha = mixture 1:2) against broad-leaved weeds

broad-leaved weeds	WL 161616 + Bromoxynil Octanoate		WL 161616 + Bromoxynil Octanoate	
	60 g a.i./ha	120 g a.e./ha	60 g a.i./ha + 120 g a.e./ha	
	% control		WE	W
Stellaria media	55	50	78	96
Galeopsis tetrahit	50	50	75	83
Veronica hederaefolia	88	37	92	96
Papaver rhoeas	7	17	23	60
Chrysanthemum segetum	5	0	5	63
Galium aparine 2. whorl	22	40	53	78
Galium aparine 3. whorl	20	70	76	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Veronica hederaefolia, Papaver rhoeas, Chrysanthemum segetum, Galium aparine (2nd and 3rd whorl) using the Colby formula was 78, 75, 92, 23, 5, 53 and 76 resp., clearly demonstrating that the combination was synergistic.

Example 4D: Herbicidal performance of the mixture WL 161616 + Bromoxynil Octanoate (60 g a.i./ha + 60 g a.e./ha = mixture 1:1) against broad-leaved weeds

broad-leaved weeds	WL 161616 + Bromoxynil Octanoate		WL 161616 + Bromoxynil Octanoate	
	60 g a.i./ha	60 g a.e./ha	60 g a.i./ha + 60 g a.e./ha	
	% control		WE	W
Stellaria media	55	17	63	90
Galeopsis tetrahit	50	12	55	65
Veronica hederaefolia	88	15	90	91
Chenopodium album	30	55	69	99
Centaurea cyanus	12	83	85	97
Galium aparine 1. whorl	70	72	92	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Veronica hederaefolia, Chenopodium album, Centaurea cyanus, Galium aparine (1st whorl) using the Colby formula was 63, 55, 90, 69, 85 and 92 resp., clearly demonstrating that the combination was synergistic.

Example 4E: Herbicidal performance of the mixture WL 161616 + Bromoxynil Octanoate (30 g a.i./ha + 240 g a.e./ha = mixture 1:6) against broad-leaved weeds

broad-leaved weeds	WL 161616 + Bromoxynil Octanoate		WL 161616 + Bromoxynil Octanoate	
	30 g a.i./ha	240 g a.e./ha	30 g a.i./ha + 240 g a.e./ha	
	% control		WE	W
Stellaria media	32	57	71	99
Veronica hederaefolia	77	80	95	99
Papaver rhoeas	5	87	88	92
Chrysanthemum segetum	9	65	68	78
Galium aparine 2. whorl	17	57	64	90
Galium aparine 3. whorl	20	86	89	92

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Veronica hederaefolia, Papaver rhoeas, Chrysanthemum segetum, Galium aparine (2nd and 3rd whorl) using the Colby formula was 71, 95, 88, 68, 64 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 4F: Herbicidal performance of the mixture WL 165181 + Bromoxynil Octanoate (120 g a.i./ha + 120 g a.e./ha = mixture 1:1) against broad-leaved weeds

broad-leaved weeds	WL 165181 + Bromoxynil Octanoate 120 g a.i./ha 120 g a.e./ha		WL 165181 + Bromoxynil Octanoate 120 g a.i./ha + 120 g a.e./ha	
	% control		WE	W
Stellaria media	60	50	80	88
Galeopsis tetrahit	72	50	86	93
Papaver rhoeas	5	17	21	73
Galium aparine 2. whorl	60	40	76	85
Galium aparine 3. whorl	52	70	86	93

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Papaver rhoeas, Galium aparine (2nd and 3rd whorl) using the Colby formula was 80, 86, 21, 76, and 86 resp., clearly demonstrating that the combination was synergistic.

Example 4G: Herbicidal performance of the mixture WL 165181 + Bromoxynil Octanoate (60 g a.i./ha + 240 g a.e./ha = mixture 1:4) against broad-leaved weeds

broad-leaved weeds	WL 165181 + Bromoxynil Octanoate		WL 165181 + Bromoxynil Octanoate	
	60 g a.i./ha	240 g a.e./ha	60 g a.i./ha + 240 g a.e./ha	
	% control		WE	W
Galium aparine 2. whorl	20	57	66	82
Galium aparine 3. whorl	22	87	90	100
Stellaria media	20	57	66	90
Veronica hederaefolia	88	80	98	99
Papaver rhoeas	3	87	87	95

WE = expected response by means of the Colby formula

W = observed response

Expected control of Galium aparine (2nd and 3rd whorl), Stellaria media, Veronica hederaefolia and Papaver rhoeas using the Colby formula was 66, 90, 66, 98 and 87 resp., clearly demonstrating that the combination was synergistic.

Example 4H: Herbicidal performance of the mixture WL 165181 + Bromoxynil Octanoate (60 g a.i./ha + 120 g a.e./ha = mixture 1:2) against broad-leaved weeds

broad-leaved weeds	WL 165181 + Bromoxynil Octanoate		WL 165181 + Bromoxynil Octanoate	
	60 g a.i./ha	120 g a.e./ha	60 g a.i./ha + 120 g a.e./ha	
	% control		WE	W
Stellaria media	20	50	60	85
Galeopsis tetrahit	62	50	80	85
Veronica persica	70	37	81	100
Chenopodium album	77	37	86	100
Galium aparine 2. whorl	20	40	52	70

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Veronica persica, Chenopodium album, Galium aparine (2nd whorl) using the Colby formula was 60, 80, 81, 86 and 52 resp., clearly demonstrating that the combination was synergistic.

Example 5A: Herbicidal performance of the mixture WL 161616 + Ioxynilsalt (60 g a.i./ha + 120 g a.i./ha = mixture 1:2) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Ioxynilsalt 120 g a.i./ha	WL 161616 + 60 g a.i./ha + Ioxynilsalt 120 g a.i./ha	
	% control		WE	W
Stellaria media	55	62	83	86
Chenopodium album	30	1	31	78
Polygonum convolvulus	47	45	71	100
Galium aparine (1. whorl)	70	10	73	83
Galium aparine (3. whorl)	20	5	24	68

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Chenopodium album, Polygonum convolvulus, Galium aparine (1. and 3. whorl) was 83,31 , 71, 73 and 24 resp., clearly demonstrating that the combination was synergistic.

Example 5B : Herbicidal performance of the mixture WL 161616 + Ioxynilsalt (30 g a.i./ha + 120 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Ioxynilsalt 120 g a.i./ha	WL 161616 + 30 g a.i./ha +	Ioxynilsalt 120 g a.i./ha
	% control		WE	W
Stellaria media	32	62	74	94
Galeopsis tetrahit	37	80	87	93
Chenopodium album	20	1	20	53
Polygonum convolvulus	30	45	62	97
Centaurea cyanus	5	84	85	96
Matricaria inodora	40	77	86	95
Galium aparine (2. whorl)	20	5	24	55
Veronica persica	70	72	92	100
Veronica hederaefolia	77	82	96	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Chenopodium album, Polygonum convolvulus, Centaurea cyanus, Matricaria inodora, Galium aparine (2. whorl) and Veronica persica was 74, 87, 20, 62, 85, 86, 24 and 92 resp., clearly demonstrating that the combination was synergistic.

Example 5C: Herbicidal performance of the mixture WL 165181 + Ioxynilsalt (60 g a.i./ha + 120 g a.i./ha = mixture 1:2) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 165181 60 g a.i./ha	Ioxynilsalt 120 g a.i./ha	WL 165181 + 60 g a.i./ha + Ioxynilsalt 120 g a.i./ha	
	% control		WE	W
Stellaria media	20	62	70	85
Chenopodium album	78	1	78	100
Polygonum convolvulus	35	45	64	100
Galium aparine (1. whorl)	75	10	78	100
Galium aparine (3. whorl)	22	5	26	68
Veronica persica	70	72	92	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Chenopodium album, Polygonum convolvulus, Galium aparine (1. and 3. whorl) and Veronica persica was 70, 78, 64, 78,26 and 92 resp., clearly demonstrating that the combination was synergistic.

Example 6A: Herbicidal response of the mixture WL 161616 + Mecoprop (60 g a.i./ha + 480 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Mecoprop 480 g a.i./ha	WL 161616 60 g a.i./ha + Mecoprop + 480 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	20	58	66	99
Galium aparine (3. whorl)	15	65	70	96
Stellaria media	15	58	64	96
Veronica persica	63	75	90	99
Chenopodium album	10	58	62	85
Cirsium arvense	23	87	90	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl), Stellaria media, Veronica persica, Chenopodium album and Cirsium arvense was 66, 70, 64, 90, 62 and 90 resp., clearly demonstrating that the combination was synergistic.

Example 6B: Herbicidal response of the mixture WL 161616 + Mecoprop (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Mecoprop 240 g a.i./ha	WL 161616 60 g a.i./ha + Mecoprop 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	82	10	84	97
Galium aparine (2. whorl)	20	10	28	86
Veronica hederaefolia	63	78	92	99
Veronica persica	60	23	69	96
Chenopodium album	10	33	40	75
Cirsium arvense	28	77	83	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Veronica hederaefolia, Veronica persica, Chenopodium album and Cirsium arvense was 84, 28, 92, 69, 40, 83 resp, clearly demonstrating that the combination was synergistic.

Example 6C: Herbicidal response of the mixture WL 161616 + Mecoprop (30 g a.i./ha + 480 g a.i./ha = mixture 1:16) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Mecoprop 480 g a.i./ha	WL 161616 + Mecoprop 30 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	63	50	82	99
Stellaria media	10	58	62	96
Veronica persica	55	75	89	94
Chenopodium album	5	58	60	70
Cirsium arvense	5	87	88	94
Senecio vulgaris	20	78	82	88

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Stellaria media, Veronica persica, Chenopodium album, Cirsium arvense, and Senecio vulgaris was 82, 62, 89, 60, 88, 82 resp., clearly demonstrating that the combination was synergistic.

Example 6D: Herbicidal response of the mixture WL 161616 + Mecoprop (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Mecoprop 240 g a.i./ha	WL 161616 + Mecoprop 30 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	63	10	67	95
Galium aparine (2. whorl)	13	10	22	88
Galium aparine (3. whorl)	10	20	28	75
Veronica hederaefolia	55	78	90	98
Veronica persica	55	23	65	99
Chenopodium album	5	33	36	73
Cirsium arvense	5	78	79	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl), Veronica hederaefolia, Veronica persica, Chenopodium album and Cirsium arvense was 67, 22, 28, 90, 65, 36 and 79 resp., clearly demonstrating that the combination was synergistic.

Example 7A: Herbicidal response of the mixture WL 161616 + Dichlorprop (60 g a.i./ha + 480 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Dichlorprop 480 g a.i./ha	WL 161616 + Dichlorprop 60 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	82	30	87	99
Galium aparine (2. whorl)	20	55	64	95
Galium aparine (3. whorl)	15	73	76	97
Stellaria media	15	53	60	100
Matricaria inodora	5	28	32	73
Chenopodium album	10	58	62	83
Cirsium arvense	23	70	77	90
Senecio vulgaris	28	60	73	94

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl), Stellaria media, Matricaria inodora, Chenopodium album, Cirsium arvense and Senecio vulgaris was 87, 64, 76, 60, 32, 62, 77 and 73 resp., clearly demonstrating that the combination was synergistic.

Example 7B: Herbicidal response of the mixture WL 161616 + Dichlorprop (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Dichlorprop 240 g a.i./ha	WL 161616 + Dichlorprop 60 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	82	23	86	92
Galium aparine (2. whorl)	20	10	28	80
Galium aparine (3. whorl)	15	43	52	80
Veronica hederaefolia	63	75	91	98
Veronica persica	60	68	87	94

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl), Veronica hederaefolia and Veronica persica was 86, 28, 52, 91 and 87 resp., clearly demonstrating that the combination was synergistic.

Example 7C: Herbicidal response of the mixture WL 161616 + Dichlorprop (30 g a.i./ha + 480 g a.i./ha = mixture 1:16) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Dichlorprop 480 g a.i./ha	WL 161616 + Dichlorprop 30 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	63	30	74	99
Galium aparine (2. whorl)	13	55	61	100
Galium aparine (3. whorl)	10	73	76	93
Stellaria media	10	53	58	93
Matricaria inodora	5	28	32	68
Chenopodium album	5	58	60	75
Cirsium arvense	5	70	72	93
Senecio vulgaris	20	60	68	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl), Stellaria media, Matricaria inodora, Chenopodium album, Cirsium arvense and Senecio vulgaris was 74, 61, 76, 58, 32, 60, 72 and 68 resp., clearly demonstrating that the combination was synergistic.

Example 7D: Herbicidal response of the mixture WL 161616 + Dichlorprop (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Dichlorprop 240 g a.i./ha	WL 161616 + Dichlorprop 30 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Galium aparine (1. whorl)	63	23	72	89
Galium aparine (3. whorl)	10	43	49	78
Veronica hederaefolia	55	75	89	99
Veronica persica	55	68	86	96
Cirsium arvense	5	63	65	83
Senecio vulgaris	20	48	58	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (3. whorl), Veronica hederaefolia, Veronica persica, Cirsium arvense and Senecio vulgaris was 72, 49, 89, 86, 65 and 58 resp., clearly demonstrating that the combination was synergistic.

Example 8A: Herbicidal performance of the mixture WL 161616 + Diclofop (120 g a.i./ha + 480 g a.i./ha = mixture 1:4) against grass weeds in post-emergence application

grass weeds	WL 161616 120 g a.i./ha	Diclofop 480 g a.i./ha	WL 161616 + Diclofop 120 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Alopecurus myosuroides	23	55	65	85
Apera spica-venti	35	5	38	70

WE = expected response by means of the Colby formula
W = observed response

Expected control of Alopecurus myosuroides and Apera spica-venti was 65 and 38 resp., clearly demonstrating that the combination was synergistic.

Example 3B: Herbicidal performance of the mixture WL 161616 + Diclofop (120 g a.i./ha + 240 g a.i./ha = mixture 1:2) against grass weeds in post-emergence application

grass weeds	WL 161616 120 g a.i./ha	Diclofop 240 g a.i./ha	WL 161616 + 120 g a.i./ha + Diclofop 240 g a.i./ha	
	% control		WE	W
Apera spica-venti	35	5	38	65
Avena fatua	10	65	69	92
Digitaria sanguinalis	70	63	89	95

WE = expected response by means of the Colby formula
W = observed response

Expected control of Apera spica-venti, Avena fatua and Digitaria sanguinalis was 38, 69 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 8C: Herbicidal performance of the mixture WL 161616 + Diclofop (60 g a.i./ha + 480 g a.i./ha = mixture 1:8) against grass weeds in post-emergence application

grass weeds	WL 161616 60 g a.i./ha	Diclofop 480 g a.i./ha	WL 161616 + Diclofop 60 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Alopecurus myosuroides	20	55	64	93

WE = expected response by means of the Colby formula
W = observed response

Expected control of Alopecurus myosuroides was 64, clearly demonstrating that the combination was synergistic.

Example 8D: Herbicidal performance of the mixture WL 161616 + Diclofop (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against grass weeds in post-emergence application

grass weeds	WL 161616 60 g a.i./ha	Diclofop 240 g a.i./ha	WL 161616 + 60 g a.i./ha + Diclofop 240 g a.i./ha	
	% control		WE	W
Avena fatua	10	65	69	83

WE = expected response by means of the Colby formula
W = observed response

Expected control of Avena fatua was 69, clearly demonstrating that the combination was synergistic.

Example 9A: Herbicidal performance of the mixture WL 161616 + MCPA (120 g a.i./ha + 720 g a.i./ha = mixture 1:6) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	MCPA 720 g a.i./ha	WL 161616 + 120 g a.i./ha + MCPA 720 g a.i./ha	
	% control		WE	W
Stellaria media	55	68	86	100
Papaver rhoeas	45	50	73	100
Senecio vulgaris	33	73	82	93
Myosotis arvensis	50	28	64	99
Galium aparine (2. whorl)	53	0	53	78
Galium aparine (3. whorl)	15	0	15	73

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Papaver rhoeas, Senecio vulgaris, Myosotis arvensis, Galium aparine (2. whorl) and Galium aparine (3. whorl) was 86, 73, 82, 64, 53, and 15 resp., clearly demonstrating that the combination was synergistic.

Example 9B: Herbicidal performance of the mixture WL 161616 + MCPA (120 g a.i./ha + 540 g a.i./ha = mixture 1:4.5) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	MCPA 540 g a.i./ha	WL 161616 + 120 g a.i./ha + MCPA 540 g a.i./ha	
	% control		WE	W
Lamium purpureum	60	25	70	88
Stellaria media	55	0	55	100
Papaver rhoeas	45	38	66	100
Senecio vulgaris	33	43	62	94
Myosotis arvensis	50	33	67	93
Centaurea cyanus	5	85	86	100
Galium aparine (2. whorl)	53	0	53	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Lamium purpureum, Stellaria media, Papaver rhoeas, Senecio vulgaris, Myosotis arvensis, Centaurea cyanus and Galium aparine (2. whorl) was 70, 55, 66, 62, 67, 86 and 53 resp., clearly demonstrating that the combination was synergistic.

Example 9C: Herbicidal performance of the mixture WL 161616 + MCPA (60 g a.i./ha + 720 g a.i./ha = mixture 1:12) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	MCPA 720 g a.i./ha	WL 161616 + 60 g a.i./ha + MCPA 720 g a.i./ha	
	% control		WE	W
Lamium purpureum	40	55	73	80
Stellaria media	30	68	78	96
Papaver rhoeas	35	50	68	100
Senecio vulgaris	25	73	80	96
Myosotis arvensis	43	28	59	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Lamium purpureum, Stellaria media, Papaver rhoeas, Senecio vulgaris and Myosotis arvensis was 73, 78, 68, 80 and 59 resp., clearly demonstrating that the combination was synergistic.

Example 9D: Herbicidal performance of the mixture WL 161616 + MCPA (60 g a.i./ha + 540 g a.i./ha = mixture 1:9) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	MCPA 540 g a.i./ha	WL 161616 + 60 g a.i./ha + MCPA 540 g a.i./ha	
	% control		WE	W
Stellaria media	30	0	30	93
Papaver rhoeas	35	38	60	100
Thlaspi arvense	25	65	74	85
Senecio vulgaris	25	43	57	90
Myosotis arvensis	43	33	62	85
Centaurea cyanus	6	85	86	100
Galium aparine (1. whorl)	80	0	80	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Papaver rhoeas, Thlaspi arvense, Senecio vulgaris, Myosotis arvensis, Centaurea cyanus and Galium aparine (1. whorl) was 30, 60, 74, 57, 62, 86 and 80 resp., clearly demonstrating that the combination was synergistic.

Example 9E: Herbicidal performance of the mixture WL 161616 + MCPA (60 g a.i./ha + 360 g a.i./ha = mixture 1:6) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	MCPA 360 g a.i./ha	WL 161616 + 60 g a.i./ha + MCPA 360 g a.i./ha	
	% control		WE	W
Veronica persica	73	48	86	92
Papaver rhoeas	35	38	60	96
Centaurea cyanus	6	68	70	94
Galium aparine (1. whorl)	80	0	80	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Veronica persica, Papaver rhoeas, Centaurea cyanus and Galium aparine (1. whorl) was 86, 60, 70 and 80 resp., clearly demonstrating that the combination was synergistic.

Example 9F: Herbicidal performance of the mixture WL 161616 + MCPA (30 g a.i./ha + 360 g a.i./ha = mixture 1:12) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	MCPA 360 g a.i./ha	WL 161616 + 30 g a.i./ha + MCPA 360 g a.i./ha	
	% control		WE	W
Veronica persica	63	48	81	98
Stellaria media	18	0	18	80
Papaver rhoeas	23	38	52	88
Thlaspi arvense	18	65	71	85
Senecio vulgaris	13	28	37	80
Centaurea cyanus	0	68	68	98
Galium aparine (1. whorl)	65	0	65	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Veronica persica, Stellaria media, Papaver rhoeas, Thlaspi arvense, Senecio vulgaris, Centaurea cyanus and Galium aparine (1. whorl) was 81, 18, 52, 71, 37, 68 and 65 resp., clearly demonstrating that the combination was synergistic.

Example 9G: Herbicidal performance of the mixture WL 161616 + MCPA (30 g a.i./ha + 270 g a.i./ha = mixture 1:9) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	MCPA 270 g a.i./ha	WL 161616 + 30 g a.i./ha +	MCPA 270 g a.i./ha
	% control		WE	W
Veronica persica	63	30	74	96
Centaurea cyanus	0	65	65	90
Galium aparine (1. whorl)	65	0	65	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Veronica persica, Centaurea cyanus and Galium aparine (1. whorl) was 74, 65 and 65 resp., clearly demonstrating that the combination was synergistic.

Example 9H: Herbicidal performance of the mixture MCPA/Flurenol (180 g a.i./ha + 90 g a.i./ha) + WL 161616 (30 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 180+90 g a.i./ha	WL 161616 30 g a.i./ha	MCPA+Flurenol + 180+90 g a.i./ha +	WL 161616 30 g a.i./ha
	% control		WE	W
Galium aparine (2. whorl)	60	23	67	95
Galium aparine (3. whorl)	30	8	36	73
Stellaria media	70	30	79	93
Papaver rhoeas	75	35	84	98
Thlaspi arvense	48	25	61	89
Myosotis arvensis	78	43	87	98

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl), Stellaria media, Papaver rhoeas, Thlaspi arvense and Myosotis arvensis was 67, 36, 79, 84, 61 and 87 resp., clearly demonstrating that the combination was synergistic.

Example 9J: Herbicidal performance of the mixture MCPA/Flurenol (270 g a.i./ha + 90 g a.i./ha) + WL 161616 (30 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 270+90 g a.i./ha	WL 161616 30 g a.i./ha	MCPA+Flurenol + 270+90 g a.i./ha +	WL 161616 30 g a.i./ha
	% control		WE	W
Galium aparine (1. whorl)	75	65	91	100
Galium aparine (2. whorl)	55	23	65	93
Galium aparine (3. whorl)	28	8	33	68
Stellaria media	75	18	80	90
Papaver rhoeas	75	22	81	97
Thlaspi arvense	48	18	57	89
Myosotis arvensis	78	30	85	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl), Stellaria media, Papaver rhoeas, Thlaspi arvense and Myosotis arvensis was 91, 65, 33, 80, 81, 57 and 85 resp., clearly demonstrating that the combination was synergistic.

Example 9K: Herbicidal performance of the mixture MCPA/Flurenol (360 g a.i./ha + 90 g a.i./ha) + WL 161616 (30 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 360+90 g a.i./ha	WL 161616 30 g a.i./ha	MCPA+Flurenol + 360+90 g a.i./ha +	WL 161616 30 g a.i./ha
	% control		WE	W
Galium aparine (1. whorl)	78	65	92	100
Galium aparine (2. whorl)	60	23	70	93
Galium aparine (3. whorl)	50	8	54	75
Stellaria media	70	18	75	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Galium aparine (3. whorl) and Stellaria media was 92, 70, 54 and 75 resp., clearly demonstrating that the combination was synergistic.

Example 9L: Herbicidal performance of the mixture MCPA/Flurenol (360 g a.i./ha + 90 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 360+90 g a.i./ha	WL 161616 60 g a.i./ha	MCPA+Flurenol + 360+90 g a.i./ha +	WL 161616 60 g a.i./ha
	% control		WE	W
Galium aparine (1. whorl)	60	40	76	95
Galium aparine (2. whorl)	50	13	57	83
Stellaria media	70	30	79	97
Thlaspi arvense	73	25	80	91
Matricaria inodora	25	15	36	73

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (1. whorl), Galium aparine (2. whorl), Stellaria media, Thlaspi arvense and Matricaria inodora was 76, 57, 79, 80 and 36 resp., clearly demonstrating that the combination was synergistic.

Example 9M: Herbicidal performance of the mixture MCPA/Flurenol (360 g a.i./ha + 180 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 360+180 g a.i./ha	WL 161616 60 g a.i./ha	MCPA+Flurenol + 360+180 g a.i./ha +	WL 161616 60 g a.i./ha
	% control		WE	W
Galium aparine (2. whorl)	70	40	82	97
Galium aparine (3. whorl)	55	13	61	75
Lamium purpureum	68	40	81	90
Stellaria media	83	30	88	100
Thlaspi arvense	70	25	78	94

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl) Galium aparine (3. whorl), Lamium purpureum, Stellaria media and Thlaspi arvense was 82, 61, 81, 88 and 78 resp., clearly demonstrating that the combination was synergistic.

Example 9N: Herbicidal performance of the mixture MCPA/Flurenol (540 g a.i./ha + 180 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 540+180 g a.i./ha	WL 161616 60 g a.i./ha	MCPA+Flurenol + 540+180 g a.i./ha +	WL 161616 60 g a.i./ha
	% control		WE	W
Galium aparine (2. whorl)	70	40	82	98
Galium aparine (3. whorl)	60	13	65	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl) and Galium aparine (3. whorl) was 82 and 65 resp., clearly demonstrating that the combination was synergistic.

Example 9P: Herbicidal performance of the mixture MCPA/Flurenol (720 g a.i./ha + 180 g a.i./ha) + WL 161616 (120 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 720+180 g a.i./ha	WL 161616 120 g a.i./ha	MCPA+Flurenol + WL 161616 720+180 g a.i./ha + 120 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	70	52	86	97
Galium aparine (3. whorl)	60	15	66	87
Matricaria inodora	38	25	53	91

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl) and Matricaria inodora was 86, 66, and 53 resp., clearly demonstrating that the combination was synergistic.

Example 9Q: Herbicidal performance of the mixture MCPA/Flurenol (720 g a.i./ha + 180 g a.i./ha) + WL 161616 (60 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	MCPA+Flurenol 720+180 g a.i./ha	WL 161616 60 g a.i./ha	MCPA+Flurenol + 720+180 g a.i./ha +	WL 161616 60 g a.i./ha
	% control		WE	W
Galium aparine (2. whorl)	70	40	82	96
Galium aparine (3. whorl)	60	13	65	83
Lamium purpureum	68	40	80	90
Matricaria inodora	38	15	47	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl), Lamium purpureum and Matricaria inodora was 82, 65, 80 and 47 resp., clearly demonstrating that the combination was synergistic.

Example 10 Herbicidal performance of the mixture WL 161616 + Pendimethalin (30 g a.i./ha + 120 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Pendimethalin 120 g a.i./ha	WL 161616 + 30 g a.i./ha +	Pendimethalin 120 g a.i./ha
	% control		WE	W
Papaver rhoeas	0	65	65	80
Veronica persica	55	45	75	94

WE = expected response by means of the Colby formula
W = observed response

Expected control of Papaver rhoeas and Veronica persica was 65 and 75 resp., clearly demonstrating that the combination was synergistic.

Example 11A Herbicidal performance of the mixture WL 161616 + Prosulfocarb (120 g a.i./ha + 3600 g a.i./ha = mixture 1:30) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Prosulfocarb 3600 g a.i./ha	WL 161616 + 120 g a.i./ha + Prosulfocarb 3600 g a.i./ha	
	% control		WE	W
Galium aparine (2. whorl)	33	60	73	98
Galium aparine (3. whorl)	40	33	60	88
Chenopodium album	35	38	60	88
Polygonum album	40	67	80	100
Stellaria media	28	15	38	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galium aparine (2. whorl), Galium aparine (3. whorl), Chenopodium album, Polygonum album and Stellaria media was 73, 60, 60, 80 and 38 resp., clearly demonstrating that the combination was synergistic.

Example 11B Herbicidal performance of the mixture WL 161616 + Prosulfocarb (120 g a.i./ha + 1800 g a.i./ha = mixture 1:15) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Prosulfocarb 1800 g a.i./ha	WL 161616 + Prosulfocarb 120 g a.i./ha + 1800 g a.i./ha	
	% control		WE	W
Chenopodium album	35	20	48	83
Polygonum convolvulus	40	68	80	95
Galium aparine (2. whorl)	33	60	73	83

WE = expected response by means of the Colby formula
W = observed response

Expected control of Chenopodium album, Polygonum convolvulus and Galium aparine (2. whorl) was 48, 80 and 73 resp., clearly demonstrating that the combination was synergistic.

Example 11C Herbicidal performance of the mixture WL 161616 + Prosulfocarb (60 g a.i./ha + 3600 g a.i./ha = mixture 1:60) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Prosulfocarb 3600 g a.i./ha	WL 161616 + 60 g a.i./ha + Prosulfocarb 3600 g a.i./ha	
	% control		WE	W
Viola arvensis	83	18	86	96
Polygonum convolvulus	20	68	74	83
Stellaria media	15	15	28	78
Galium aparine (2. whorl)	28	60	71	90
Galium aparine (3. whorl)	20	33	46	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Viola arvensis, Polygonum convolvulus, Stellaria media, Galium aparine (2. whorl) and Galium aparine (3. whorl) was 86, 74, 28, 71 and 46 resp., clearly demonstrating that the combination was synergistic.

Example 11D Herbicidal performance of the mixture WL 161616 + Prosulfocarb (60 g a.i./ha + 1800 g a.i./ha = mixture 1:30) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Prosulfocarb 1800 g a.i./ha	WL 161616 + Prosulfocarb 60 g a.i./ha + 1800 g a.i./ha	
	% control		WE	W
Viola arvensis	83	0	83	94
Chenopodium album	28	20	42	78
Polygonum convolvulus	20	0	20	90
Veronica persica	60	73	89	100
Galium aparine (2. whorl)	28	28	48	70

WE = expected response by means of the Colby formula
W = observed response

Expected control of Viola arvensis, Chenopodium album, Polygonum convolvulus, Veronica persica and Galium aparine (2. whorl) was 83, 42, 20, 89 and 48 resp., clearly demonstrating that the combination was synergistic.

Example 11E Herbicidal performance of the mixture WL 161616 + Prosulfocarb (30 g a.i./ha + 1800 g a.i./ha = mixture 1:60) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Prosulfocarb 1800 g a.i./ha	WL 161616 + Prosulfocarb 30 g a.i./ha + 1800 g a.i./ha	
	% control		WE	W
Viola arvensis	53	0	53	88
Polygonum convolvulus	10	0	10	70
Galium aparine (2. whorl)	15	28	39	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Viola arvensis, Polygonum convolvulus and Galium aparine (2. whorl) was 53, 10 and 39 resp., clearly demonstrating that the combination was synergistic.

Example 11F Herbicidal performance of the mixture WL 161616 + Prosulfocarb (30 g a.i./ha + 900 g a.i./ha = mixture 1:30) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Prosulfocarb 900 g a.i./ha	WL 161616 + 30 g a.i./ha + Prosulfocarb 900 g a.i./ha	
	% control		WE	W
Viola arvensis	53	0	53	83
Veronica persica	55	30	69	95

WE = expected response by means of the Colby formula
W = observed response

Expected control of Viola arvensis and Veronica persica was 53 and 69 resp., clearly demonstrating that the combination was synergistic.

Example 17: Herbicidal performance of the mixture WL 161616 + Amidosulfuron (60 g a.i./ha + 30 g a.i./ha = mixture 2:1) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Amidosulfuron 30 g a.i./ha	WL 161616 + 60 g a.i./ha + Amidosulfuron 30 g a.i./ha	
	% control		WE	W
Chenopodium album	5	71	72	93
Cirsium arvense	30	65	76	94
Myosotis arvensis	43	53	73	86

WE = expected response by means of the Colby formula
W = observed response

Expected control of Chenopodium album, Cirsium arvense and Myosotis arvensis was 72, 76, and 73 resp., clearly demonstrating that the combination was synergistic.

Example 13A Herbicidal performance of the mixture WL 161616 + Aclonifen (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Aclonifen 240 g a.i./ha	WL 161616 + 60 g a.i./ha +	Aclonifen 240 g a.i./ha
	% control		WE	W
Lamium purpureum	65	63	87	96
Veronica persica	53	10	58	85
Galium aparine	73	63	90	98
Matricaria inodora	55	8	59	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Lamium purpureum, Veronica persica, Galium aparine and Matricaria inodora was 87, 58, 90 and 59 resp., clearly demonstrating that the combination was synergistic.

Example 13B Herbicidal performance of the mixture WL 161616 + Aclonifen (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Aclonifen 240 g a.i./ha	WL 161616 + 30 g a.i./ha + Aclonifen 240 g a.i./ha	
	% control		WE	W
Lamium purpureum	45	63	80	94
Veronica persica	48	10	53	80

WE = expected response by means of the Colby formula
W = observed response

Expected control of Lamium purpureum and Veronica persica was 80 and 53 resp., clearly demonstrating that the combination was synergistic.

Example 14A Herbicidal performance of the mixture WL 161616 + Pyridate (120 g a.i./ha + 480 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Pyridate 480 g a.i./ha	WL 161616 + Pyridate 120 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Stellaria media	35	65	77	100
Galeopsis tetrahit	13	70	74	95
Polygonum convolvulus	28	55	68	99
Senecio vulgaris	53	53	78	93

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Polygonum convolvulus and Senecio vulgaris was 77, 74, 68, and 78 resp., clearly demonstrating that the combination was synergistic.

Example 14B Herbicidal performance of the mixture WL 161616 + Pyridate (120 g a.i./ha + 240 g a.i./ha = mixture 1:2) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Pyridate 240 g a.i./ha	WL 161616 + Pyridate 120 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Stellaria media	35	30	55	100
Galeopsis tetrahit	13	35	43	88
Sinapis arvensis	75	55	89	100
Polygonum convolvulus	28	33	52	100
Chenopodium album	80	0	80	88
Galium aparine (1. whorl)	63	55	83	100
Galium aparine (2. whorl)	43	43	68	89
Galium aparine (3. whorl)	23	38	52	90

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Sinapis arvensis, Polygonum convulvulus, Chenopodium album, Galium aparine (1. whorl), Galium aparine (2. whorl) and Galium aparine (3. whorl) was 55, 43, 89, 52, 80, 83, 68 and 52 resp., clearly demonstrating that the combination was synergistic.

Example 14C Herbicidal performance of the mixture WL 161616 + Pyridate (120 g a.i./ha + 120 g a.i./ha = mixture 1:1) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Pyridate 120 g a.i./ha	WL 161616 + Pyridate 120 g a.i./ha + 120 g a.i./ha	
	% control		WE	W
Stellaria media	35	13	43	89
Sinapis arvensis	75	20	80	100
Veronica hederaefolia	90	0	90	100
Matricaria inodora	48	53	76	100
Polygonum convolvulus	28	15	39	84
Cirsium arvense	50	30	65	75
Galium aparine (1. whorl)	63	18	70	100
Galium aparine (2. whorl)	43	23	56	86

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Sinapis arvensis, Veronica hederaefolia, Matricaria inodora, Polygonum convolvulus, Cirsium arvense, Galium aparine (1. whorl) and Galium aparine (2. whorl) was 43, 80, 90, 76, 39, 65, 70 and 56 resp., clearly demonstrating that the combination was synergistic.

Example 14D Herbicidal performance of the mixture WL 161616 + Pyridate (60 g a.i./ha + 480 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Pyridate 480 g a.i./ha	WL 161616 + Pyridate 60 g a.i./ha + 480 g a.i./ha	
	% control		WE	W
Stellaria media	33	65	77	100
Galeopsis tetrahit	10	70	73	93
Polygonum convolvulus	28	55	68	100
Chenopodium album	53	50	77	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Polygonum convolvulus and Chenopodium album was 77, 73, 68, and 77 resp., clearly demonstrating that the combination was synergistic.

Example 14E Herbicidal performance of the mixture WL 161616 + Pyridate (60 g a.i./ha + 240 g a.i./ha = mixture 1:4) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Pyridate 240 g a.i./ha	WL 161616 + Pyridate 60 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Stellaria media	33	30	53	99
Galeopsis tetrahit	10	35	42	83
Sinapis arvensis	65	55	84	100
Veronica hederaefolia	78	48	89	100
Veronica persica	75	65	91	100
Polygonum convolvulus	28	33	52	99
Chenopodium album	53	0	53	85
Galium aparine (1. whorl)	55	55	80	100
Galium aparine (2. whorl)	30	43	60	80
Galium aparine (3. whorl)	18	38	49	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Sinapis arvensis, Veronica hederaefolia, Veronica persica, Polygonum convulvulus, Chenopodium album, Galium aparine (1. whorl), Galium aparine (2. whorl) and Galium aparine (3. whorl) was 53, 42, 84, 89, 91, 52, 53, 80, 60 and 49 resp., clearly demonstrating that the combination was synergistic.

Example 14F Herbicidal performance of the mixture WL 161616 + Pyridate (60 g a.i./ha + 120 g a.i./ha = mixture 1:2) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Pyridate 120 g a.i./ha	WL 161616 + Pyridate 60 g a.i./ha + 120 g a.i./ha	
	% control		WE	W
Stellaria media	33	13	42	85
Galeopsis tetrahit	10	25	33	55
Sinapis arvensis	65	20	72	100
Veronica hederaefolia	78	0	78	99
Veronica persica	75	55	89	96
Matricaria inodora	5	53	55	100
Chenopodium album	53	0	53	83
Cirsium arvense	30	53	67	92
Galium aparine (1. whorl)	55	18	63	97

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Sinapis arvensis, Veronica hederaefolia, Veronica persica, Matricaria inodora, Chenopodium album, Cirsium arvense, and Galium aparine (1. whorl) was 42, 33, 72, 78, 89, 55, 53, 67 and 63 resp., clearly demonstrating that the combination was synergistic.

Example 14 G Herbicidal performance of the mixture WL 161616 + Pyridate (30 g a.i./ha + 240 g a.i./ha = mixture 1:8) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Pyridate 240 g a.i./ha	WL 161616 + Pyridate 30 g a.i./ha + 240 g a.i./ha	
	% control		WE	W
Stellaria media	15	30	41	92
Galeopsis tetrahit	8	35	40	75
Sinapis arvensis	40	55	73	100
Veronica hederaefolia	65	48	82	99
Veronica persica	70	65	90	97
Matricaria inodora	5	88	89	100
Polygonum convolvulus	18	33	45	87
Chenopodium album	13	0	13	99
Senecio vulgaris	25	38	54	70
Galium aparine (1. whorl)	15	55	62	100
Galium aparine (2. whorl)	10	43	49	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Stellaria media, Galeopsis tetrahit, Sinapis arvensis, Veronica hederaefolia, Veronica persica, Matricaria inodora, Polygonum convulvulus, Chenopodium album, Senecio vulgaris, Galium aparine (1. whorl) and Galium aparine (2. whorl) was 41, 40, 73, 82, 90, 89, 45, 13, 54, 62 and 49 resp., clearly demonstrating that the combination was synergistic.

Example 15A Herbicidal performance of the mixture WL 161616 + Flurenol (120 g a.i./ha + 180 g a.i./ha = mixture 1:1.5) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Flurenol 180 g a.i./ha	WL 161616 + 120 g a.i./ha +	Flurenol 180 g a.i./ha
	% control		WE	W
Papaver rhoeas	45	58	77	95
Sinapis arvensis	58	53	80	85
Myosotis arvensis	50	58	79	95
Galium aparine (2. whorl)	53	58	80	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Papaver rhoeas, Sinapis arvensis, Myosotis arvensis and Galium aparine (2. whorl) was 77, 80, 79 and 80 resp., clearly demonstrating that the combination was synergistic.

Example 15B Herbicidal performance of the mixture WL 161616 + Flurenol (60 g a.i./ha + 180 g a.i./ha = mixture 1:3) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Flurenol 180 g a.i./ha	WL 161616 + 60 g a.i./ha + Flurenol 180 g a.i./ha	
	% control		WE	W
Lamium purpureum	40	68	81	92
Stellaria media	30	78	85	92
Papaver rhoeas	35	58	73	90
Myosotis arvensis	43	58	76	85
Galium aparine (2. whorl)	40	58	75	91

WE = expected response by means of the Colby formula
W = observed response

Expected control of Lamium purpureum, Stellaria media, Papaver rhoeas, Myosotis arvensis and Galium aparine (2. whorl) was 81, 85, 73, 76 and 75 resp., clearly demonstrating that the combination was synergistic.

Example 15C Herbicidal performance of the mixture WL 161616 + Flurenol (60 g a.i./ha + 90 g a.i./ha = mixture 1:1.5) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Flurenol 90 g a.i./ha	WL 161616 + 60 g a.i./ha + Flurenol 90 g a.i./ha	
	% control		WE	W
Veronica persica	73	43	84	93
Papaver rhoeas	35	58	73	84
Myosotis arvensis	43	48	70	85
Galium aparine (2. whorl)	40	50	70	93

WE = expected response by means of the Colby formula
W = observed response

Expected control of Veronica persica, Papaver rhoeas, Myosotis arvensis and Galium aparine (2. whorl) was 84, 73, 70 and 70 resp., clearly demonstrating that the combination was synergistic.

Example 15D Herbicidal performance of the mixture WL 161616 + Flurenol (30 g a.i./ha + 90 g a.i./ha = mixture 1:3) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 30 g a.i./ha	Flurenol 90 g a.i./ha	WL 161616 + 30 g a.i./ha +	Flurenol 90 g a.i./ha
	% control		WE	W
Veronica persica	63	43	79	88
Lamium purpureum	33	58	72	83
Galium aparine (1. whorl)	65	23	73	92

WE = expected response by means of the Colby formula
W = observed response

Expected control of Veronica persica, Lamium purpureum and Galium aparine (2. whorl) was 79, 72 and 73 resp., clearly demonstrating that the combination was synergistic.

Example 16A Herbicidal performance of the mixture WL 161616 + Fluroxypyr (120 g a.i./ha + 90 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 120 g a.i./ha	Fluroxypyr 90 g a.i./ha	WL 161616 + 120 g a.i./ha + Fluroxypyr 90 g a.i./ha	
	% control		WE	W
Matricaria inodora	45	65	81	97
Rumex crispus	43	68	82	99
Cirsium arvense	53	5	55	73

WE = expected response by means of the Colby formula
W = observed response

Expected control of Matricaria inodora, Rumex crispus and Cirsium arvense was 81, 82 and 55 resp., clearly demonstrating that the combination was synergistic.

Example 16B Herbicidal performance of the mixture WL 161616 + Fluroxypyr (60 g a.i./ha + 90 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Fluroxypyr 90 g a.i./ha	WL 161616 + 60 g a.i./ha +	Fluroxypyr 90 g a.i./ha
	% control		WE	W
Matricaria inodora	40	65	79	91
Chenopodium album	83	35	89	96

WE = expected response by means of the Colby formula
W = observed response

Expected control of Matricaria inodora and Chenopodium album was 79 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 16C Herbicidal performance of the mixture WL 161616 + Fluroxypyr (60 g a.i./ha + 45 g a.i./ha) against broad-leaved weeds in post-emergence application

broad-leaved weeds	WL 161616 60 g a.i./ha	Fluroxypyr 45 g a.i./ha	WL 161616 + 60 g a.i./ha + Fluroxypyr 45 g a.i./ha	
	% control		WE	W
Galeopsis tetrahit	50	60	80	89
Matricaria inodora	40	5	43	74
Veronica persica	68	73	89	100

WE = expected response by means of the Colby formula
W = observed response

Expected control of Galeopsis tetrahit, Matricaria inodora and Veronica persica was 80, 43 and 89 resp., clearly demonstrating that the combination was synergistic.

Example 17A Herbicidal performance of the mixture WL 161616 + Flamprop-M-isopropyl (120 g a.i./ha + 700 g a.i./ha) against grass weeds in post-emergence application

grass weeds	WL 161616 120 g a.i./ha	Flamp.-M-isoprop. 700 g a.i./ha	WL 161616 + Flamp.-M-isoprop. 120 g a.i./ha + 700 g a.i./ha	
	% control		WE	W
Setaria viridis	73	0	73	90
Digitaria sanguinalis	63	0	63	92

WE = expected response by means of the Colby formula
W = observed response

Expected control of Setaria viridis and Digitaria sanguinalis was 73 and 63 resp., clearly demonstrating that the combination was synergistic.

Example 17B Herbicidal performance of the mixture WL 161616 + Flamprop-M-isopropyl (60 g a.i./ha + 700 g a.i./ha) against grass weeds in post-emergence application

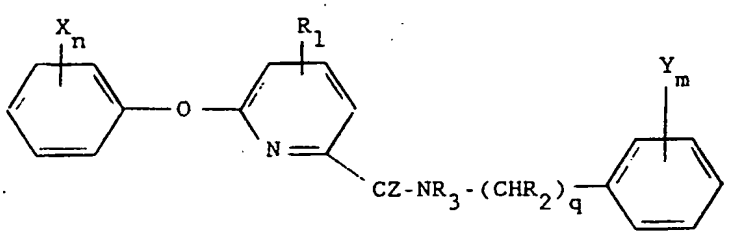
grass weeds	WL 161616 60 g a.i./ha	Flamp.-M-isoprop. 700 g a.i./ha	WL 161616 + Flamp.-M-isoprop. 60 g a.i./ha + 700 g a.i./ha	
	% control		WE	W
Digitaria sanguinalis	53	0	53	85

WE = expected response by means of the Colby formula
W = observed response

Expected control of Digitaria sanguinalis was 53, clearly demonstrating that the combination was synergistic.

C L A I M S

1. Herbicidal composition comprising a herbicidally acceptable carrier and/or surface active agent together with, as active ingredient, a mixture of at least one aryloxypicolinamide compound of the general formula I



(I)

in which

Z represents an oxygen or sulphur atom;

R^1 represent a hydrogen or halogen atom or an alkyl or haloalkyl group;

R^2 represents a hydrogen atom or an alkyl group;

q is 0 or 1;

R^3 represents a hydrogen atom or an alkyl or alkenyl group;

the or each group X independently represents a halogen atom or an optionally subsituted alkyl or alkoxy group, or an alkenyloxy, alkynyloxy, cyano, carboxy, alkoxycarbonyl, (alkylthio)carbonyl, alkylcarbonyl, amido, alkylamido, nitro, alkylthio, haloalkylthio, alkenylthio, alkynylthio, alkylsulphinyl, alkylsulphonyl, alkyloximinoalkyl or alkenyloximinoalkyl group;

n is 0 or an integer from 1 to 5;

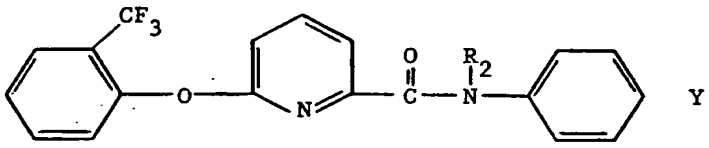
the or each group Y independently represents a halogen atom or an alkyl, nitro, cyano, haloalkyl, alkoxy or haloalkoxy group;

and m is 0 or an integer from 1 to 5;

together with a second component selected from:-

a) a urea-type herbicide;
b) a triazine-type herbicide;
c) a hydroxybenzonitrile herbicide;
d) an aryloxyalkanoic acid herbicide;
e) a dinitroaniline herbicide;
f) a thiocarbamate herbicide;
g) amidosulfuron;
h) a diphenyl ether herbicide;
i) a pyridazine herbicide;
j) a fluorene carboxylic acid herbicide;
k) a pyridyloxyacetic acid herbicide; and
l) an arylalanine herbicide.

2. Composition as claimed in claim 1, wherein the aryloxypicolinamide is of the general formula II



(II)

3. Composition as claimed in claim 1 or 2 wherein the second component is selected from chlortoluron, isoproturon, linuron, neburon, atrazine, cyanazine, simazine, bromoxynil, ioxynil, dichloroprop, diclofop, MCPA, mecoprop (CMPP), pendimethalin, prosulfocarb, amidosulfuron, aclonifen, pyridate, flurenol, fluroxypyr, and flamprop-isopropyl.

4. Composition as claimed in claim 1, 2 or 3 wherein the ratio (by weight) of the aryloxypicolinamide to the second component is from 2:1 to 1:60.

5. Composition as claimed in any one of claims 1-4 wherein the second component is a urea or thiocarbamate herbicide and the ratio of AOP to that second component is 1:10 to 1:60.

6. Composition as claimed in any one of claims 1 to 4 wherein the second component is amidosulfuron or a pyridyloxyacetic acid and the ratio of AOP to that second component is 2:1 to 1:20.

7. Method of controlling the growth of weeds at a cereal locus which comprises applying to the locus an aryloxypicolinamide as defined in claim 1 or 2, and a second component selected from those defined in claim 1 or 3.

8. Method as claimed in claim 7 wherein the AOP is applied to the locus at a rate of 25 to 250 gai/ha.

9. Method as claimed in claim 7 or 8 wherein the second component is a urea or thiocarbamate herbicide and is applied to the locus at the rate of 1000-2500 gai/ha.

10. Method as claimed in claim 7 or 8 wherein the second component is amidosulfuron or a pyridyloxyacetic acid herbicide and is applied to the locus at the rate of 25 to 100 gai/ha.

INTERNATIONAL SEARCH REPORT

Inter. nal Application No
PCT/EP 93/02737

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A01N43/40 //(A01N43/40,47:36,47:30,47:12,47:02,45:02,43:70, 39:04,39:02,37:46,37:40,33:22,33:18)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP,A,0 447 004 (SHELL INTERNATIONALE RESEARCH) 18 September 1991 cited in the application see page 2, line 3 - line 12 see page 2, line 27 - line 58 see page 6, line 18 - line 21 see page 7, line 32 - line 33 see page 48, line 18 - line 21 ---	1-5,7-9
Y	EP,A,0 211 518 (MAY & BAKER) 25 February 1987 see page 1, line 15 - page 6, line 8 ---	1-5,7-9
A	EP,A,0 223 449 (MAY & BAKER) 27 May 1987 see page 1, line 3 - page 5, line 25 ---	1-10
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[X] Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 December 1993	10. 01. 94

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	EP,A,0 273 668 (MAY & BAKER) 6 July 1988 see page 2, line 17 - page 3, line 4	1-10
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